ARBORICULTURAL IMPACT REPORT

SYDNEY UNIVERSITY - ABERCOMBIE PRECINCT
DARLINGTON NSW

PREPARED FOR SYDNEY UNIVERSITY

5 APRIL 2012

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EXECUTIVE SUMMARY

Landscape Matrix Pty Ltd has been engaged Sydney University to prepare an Arboricultural Impact Report in relation to trees located within the area of its campus known as the Abercrombie Precinct in Darlington

This assessment is required to assess and address issues raised in submissions with respect to tree removal and impacts of the development upon existing vegetation on-site and on the adjoining Darlington Public School.

The site is bounded by Darlington Road to the north, Codington Street to the east, Abercrombie Street to the south and Darlington Public School and Golden Grove Street to the west. Due to the long history of past development and use of the land it is considered most probable that none of the trees are remnants of the original vegetation of the locality and comprises planted specimens in addition to some weeds species (e.g. Chinese Hackberry).

30 trees that were identified in earlier assessments and submissions as being of significance have been assessed in preparation of this report. The trees assessed in the report include trees on the site and trees that adjoin the site and are within Darlington Public School.

Using the nominated assessment methodologies the trees have been categorised according to their retention values with 9 trees identified as priorities for retention. A further 16 trees were identified as being worthy of consideration for retention. Tree protection zones are identified in the report for those trees identified as either a priority for retention or for consideration for retention. The remaining 5 trees were identified as not being of specific consideration in the design process.

Two of the species assessed (*Syzygium paniculatum* - Magenta Lily Pilly and *Eucalyptus scoparia* - Wallangara White Gum, Willow Gum) are listed as a threatened species under the NSW Threatened Species Conservation Act 1995 and the Commonwealth Environment Protection and Biodiversity Conservation Act 1999. However, these trees are considered to be planted specimens rather than remnant vegetation as these species are not recorded as occurring naturally at this locality. Taking this into account it is considered that there will not be a significant impact on threatened species if tree number 28 (Willow Gum) is removed (when applying the relevant test under Section 5A of the Environment Planning and Assessment Act 1979).

Generic tree protection measures are identified in the recommendations to provide guidance on likely measures that will be required prior to and during the construction process to minimise risk of damage to trees identified for retention on the site.

To facilitate construction of the proposed new buildings 3 trees will require removal or are proposed to be removed as part of the works.

In addition to the trees proposed for removal there are 6 trees or groups of trees proposed for retention in the vicinity of works that may be potentially impacted by the works.

1. BACKGROUND

Landscape Matrix Pty Ltd has been engaged by Sydney University to prepare an Arboricultural Impact Report in relation to trees located within the area of its campus known as the Abercrombie Precinct in Darlington.

The University has finalised its design/development options for the precinct and requires the report to assess and address those issues raised in submissions with respect to tree removal and impacts of the development upon existing vegetation on-site, including the adjoining Darlington Public School. Specifically, the client is seeking a report that addresses the following key outcomes:

- Inspect the site to provide an assessment of trees of particular interest that have been identified in the submissions and the earlier arboricultural assessment undertaken by The Tree School;
- Review the submissions and in particular the submissions by the Department of Planning and Infrastructure (DP and I) and the City of Sydney in respect of tree preservation;
- Prepare a report providing advice on tree retention and removal, including appropriate setbacks and tree protection zones.

The site is located in Darlington and is bounded by Darlington Road to the north, Codington Street to the east, Abercrombie Street to the south and Darlington Public School and Golden Grove Street to the west. The location of the Site is illustrated in figure 1 as follows:

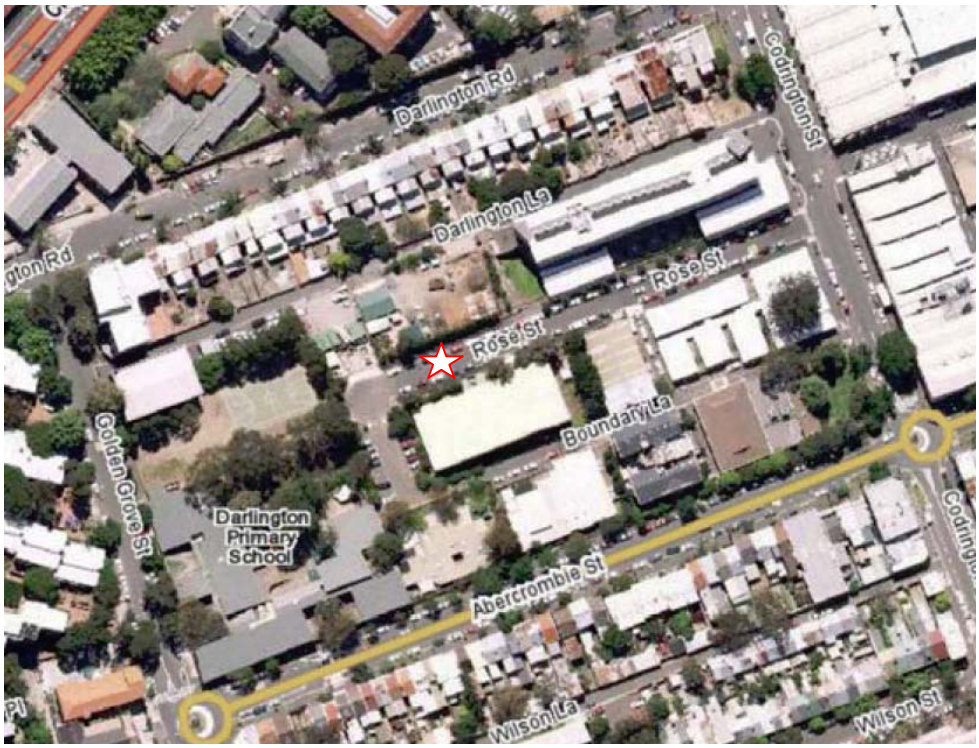


Figure 1: Location Map: Abercrombie precinct, Darlington
(Source: www.whereis.com)

2. METHODOLOGY

2.1 INTRODUCTION

A review of an earlier Arborist Report prepared for the site and submissions received in response to a development application for the site have been undertaken. The report, dated January 2008, was prepared by The Tree School for Jones Lang Lasalle, Cox Richardson and Campus Property & Services.

A total of 9 submissions from Authorities were received in response to the development proposal and, of these, 3 submissions raised issues regarding tree removal as follows:

- The Department of Planning and Infrastructure (DP and I) raised concerns regarding the proposed removal of a mature Sydney Blue Gum (*Eucalyptus saligna*) near Rose Street, the mature Lemon Scented Gum (*Corymbia citriodora*) in Boundary Lane and Eucalypts in Darlington Public School in the vicinity of the site. The DP and I has requested consideration of protection of these trees and other trees identified in the earlier report prepared by The Tree School;
- Sydney Metropolitan Development Authority (SMDA) raised concerns regarding the proposed removal of a mature Sydney Blue Gum (*Eucalyptus saligna*) near Rose Street; and
- City of Sydney raised a number of issues regarding removal/retention of trees and made specific reference to a number of individual trees and groups of trees identified in the Arborist Report prepared by The tree School including the mature Sydney Blue Gum near Rose Street referred to by SMDA.

In additional to the above, 63 public submissions were received during the community consultation process and 5 of these submissions referred to tree loss. Whist these submission were not made during the formal exhibition period and none of them specifically referred to the loss of individual trees or groups of trees, the concerns raised have informed the proposed development.

Site inspections were undertaken on 15th and 22nd December 2011 to collect data for 30 trees or groups of trees on the site identified in the earlier report prepared by The Tree School and submissions as being of importance. The data for the trees was then combined and has been used to assess various aspects of the trees in relation to health, vigour, condition, landscape value and retention value. A number methodologies were used in this process.

The methodologies used in preparation of this report comprised 4 distinct areas. These are:

- Tree health, vigour and condition;
- Landscape value or significance;
- Tree retention values; and
- Tree protection zones.

2.2 TREE HEALTH AND CONDITION

The tree health and condition assessment was based upon a visual inspection of the trees from ground level using aspects of the Visual Tree Assessment (VTA) method described by

Mattheck & Breloer (1994). The visual inspection included examination of the trees' dimensions, foliage density and foliage health, form, structure, structural condition, overall health and vigour and landscape significance.

The inspection was limited to visual inspection of the trees without dissection, probing or coring. No aerial inspection of the trees was carried out and the assessment did not include any significant woody tissue testing or root investigation.

The tree heights and canopy spreads were estimated and are expressed in metres and the tree diameters at breast height (DBH) were measured with a with standard metal tape at 1.4 metres above ground level and are expressed in millimetres. DBH were rounded up to the nearest 5mm increment.

2.3 LANDSCAPE VALUE OR SIGNIFICANCE

The landscape value or significance of a tree in the landscape is a critical step in the process of determining the importance that a particular tree may have on a site. However, determining tree significance can be a subjective process unless a consistent basis is established to guide the rating.

A number of rating systems have been developed in the past including, for example, the rating system identified in British Standard 5837-2005 (BSI 2005). Typically, these rating systems consider criteria such as size, form, health, heritage, historical and ecological values to assist in determining a rating for the tree.

The Institute of Australian Consulting Arboriculturists (IACA) has developed a rating system for assessing tree significance. This rating system is attached at appendix D and provides the following rating choices based on a selection of criteria:

- High Significance in the Landscape
- Medium Significance in the Landscape
- Low Significance in the Landscape

Trees need to meet 3 criteria to be selected in that rating in the system developed by IACA. (IACA 2010)

The system developed by IACA has been used as a guide to rate the landscape value or significance of trees asses for this report. However, the following modifications have been made:

- A fourth category (after Low landscape significance) of Environmental or Noxious Weed has been added; and
- 'Medium Landscape Significance' has been changed to 'Moderate Landscape Significance'
- Where considered appropriate, a rating between 2 categories has been allowed - e.g. 'Moderate to High Landscape Significance'.

2.4 RETENTION VALUES

Determining the retention value of trees on a development site requires the synthesis of baseline data and subsequent categorisations of individual trees to provide a relative

retention value when compared with other trees on the site. The two principal criteria used in determining the retention value of a tree are its sustainability or projected lifespan in the landscape (e.g. SULE) and the tree's landscape value rating.

A number of table or 'matrix' style methods have been successfully used by various authors to assist in consistently determining the retention values of trees on development sites (e.g. Morton 2010, Couston and Howden 2001).

The Institute of Australian Consulting Arboriculturists (IACA) has developed a draft system for assessing tree retention values. This draft system is referred to as 'Tree Retention Value - Priority Matrix and compares life expectancy with landscape significance to identify the following retention values:

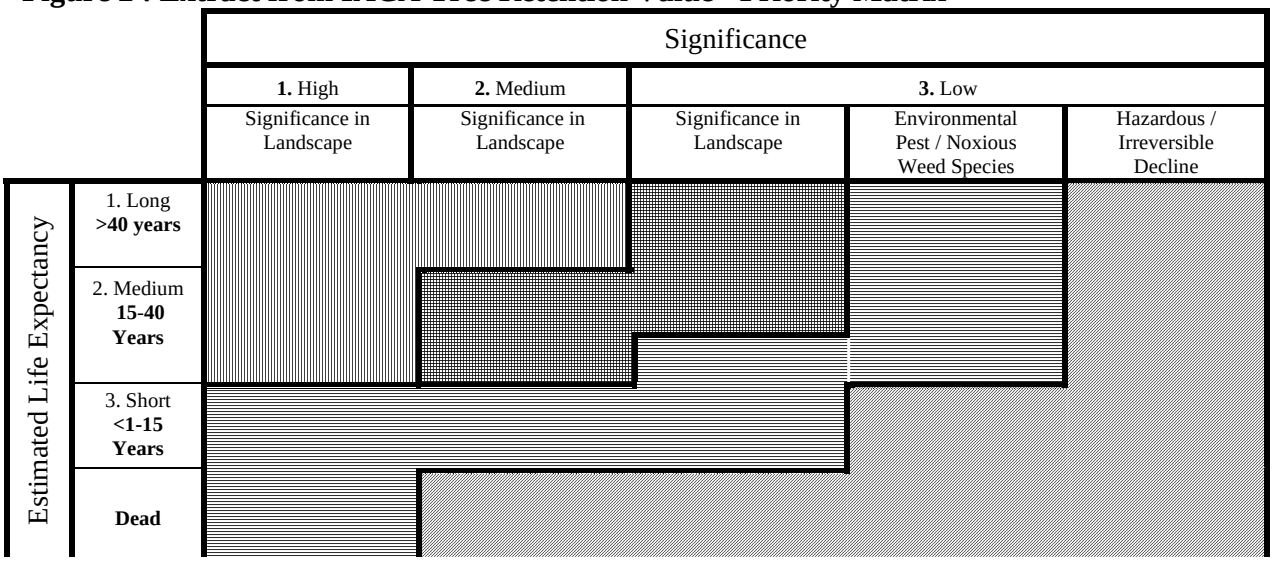
- Priority for retention;
- Consider for retention;
- Consider for removal; and
- Priority for removal

The draft system developed by IACA has been used to guide determination of retention values for this report with the following changes to the methodology:

- An additional category has been added - the additional category is for those trees not identified for retention or removal - this provides for those trees that may be of low or low to moderate landscape significance but could be considered for retention, particularly in the short term, if redevelopment of the site is undertaken and other vegetation is removed.
- Trees of high landscape significance and medium to long SULE identified as the priorities for retention (i.e. trees of moderate landscape significance and long SULE are not identified as a priority for retention due to their moderate significance); and

The following table is an extract from the IACA Tree Retention Value - Priority Matrix which illustrates the matrix system.

Figure 2 : Extract from IACA Tree Retention Value - Priority Matrix



Legend for Matrix Assessment	
	Priority for Retention (High) - These trees are considered important for retention and should be retained and protected. Design modification or re-location of building/s should be considered to accommodate the setbacks as prescribed by the Australian Standard AS4970 *Protection of trees on development sites*. Tree sensitive construction measures must be implemented e.g. pier and beam etc if works are to proceed within the Tree Protection Zone.
	Consider for Retention (Medium) - These trees may be retained and protected. These are considered less critical; however their retention should remain priority with removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.
	Consider for Removal (Low) – These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.
	Priority for Removal – These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.

Source IACA (2010)

2.5 TREE PROTECTION ZONES

A number of methods to determine the likely extent of root zones and appropriate setbacks for tree root protection zones for trees on development sites have been developed in the past. The key criteria used in determining setbacks is the tree's trunk diameter at breast height (DBH) in conjunction with other factors including the sensitivity of the species in question to environmental disturbance/change, the age of the tree and the tree's health and vigour at the time.

Harris et al (2004) provide formulae for calculating tree protection zones based on the above criteria and modified from the 1991 British Standard for protection of trees on construction sites (BS 5837:1991). The 2005 version of the British Standard (BS 5837:2005) recommends a radius of 12 times the tree's DBH. For multi trunked trees BS 5837:2005 recommends a setback of 10 times the basal trunk diameter.

The Australian Standard AS 4970-2009 Protection of Trees on Construction Sites also identifies a 'Tree Protection Zone' (TPZ) of 12 times the tree's DBH. AS 4790-2009 also provides a formula for calculating the "Structural Root Zone' of trees on development sites. This is the area required for stability. In regard to palms, other monocots, cycads and tree ferns the Standard identifies the Tree Protection Zone should not be less than 1 metre outside the crown projection. (Australian Standards Association 2009)

The tree protection zones identified in this report have been calculated using the Australian Standard 'AS 4970 Protection of trees on construction sites' and are the setback from the trees where disturbance (e.g. soil level changes, compaction, excavation etc) must be minimised to reduce potential impacts on the long term health of the trees. The zones have been rounded to the nearest tenth of a metre. These zones are illustrated in Appendix E which contains an extract (figure2) from AS4970-2009.

Preferably, no more than 10% of the tree protection zone should be disturbed with compensation made by extension of other areas of the TPZ to compensate for the area(s) disturbed. Where greater than 10% of the tree protection zone is potentially disturbed the tree's viability needs to be investigated and demonstrated by the project arborist. The structural root zone is the area required for stability and where disturbance of any sort should be avoided.

3. TREE ASSESSMENT RESULTS

3. 1 BRIEF SUMMARY OF TREES ASSESSED FOR THE REPORT

During the site inspections undertaken on 15 and 22 December 2011 a total of 30 trees at or adjacent to the site were assessed with specific data collected for each tree. This data is summarised in Appendix B – Tree Data Summary. These 30 trees have been identified in earlier assessments and submissions as being of significance and include trees on the site and trees within Darlington Public School that adjoin the site.

The 30 trees assessed for the report are summarised in table 1 as follows:

Table 1: Summary of species present, number and height range

SPECIES	COMMON NAME	NUMBER PRESENT	HEIGHT RANGE
Acmena smithii	Lilly Pilly	1	9
Casuarina glauca	Swamp Oak	1	12
Celtis sinensis	Chinese Celtis	1	12
Corymbia citriodora	Lemon Scented Gum	1	18
Corymbia maculata	Spotted Gum	3	12 to 22
Elaeocarpus reticulatus	Blueberry Ash	4	6 to 8
Eucalyptus saligna	Sydney Blue Gum	4	9 to 26
Eucalyptus scoparia	Wallangarra White Gum	2	12 to 14
Flindersia australis	Crows Ash, Australian Teak	2 rows of trees (1 x 5 trees, 1 x 13 trees)	Up to 8
Fraxinus Raywood	Claret Ash	3	6 to 7
Mangifera indica	Mango	1	8
Pinus radiata	Monterey Pine	1	10
Quercus ilex	Holly Oak, Holm Oak	1	15
Robinia pseudoacacia 'Frisia'	Golden Robinia	1	8
Syzigium paniculatum	Brush Cherry, Magenta Lilli Pilli	4	8.5 to 10
	Total	**30**	**6 to 26 metres**

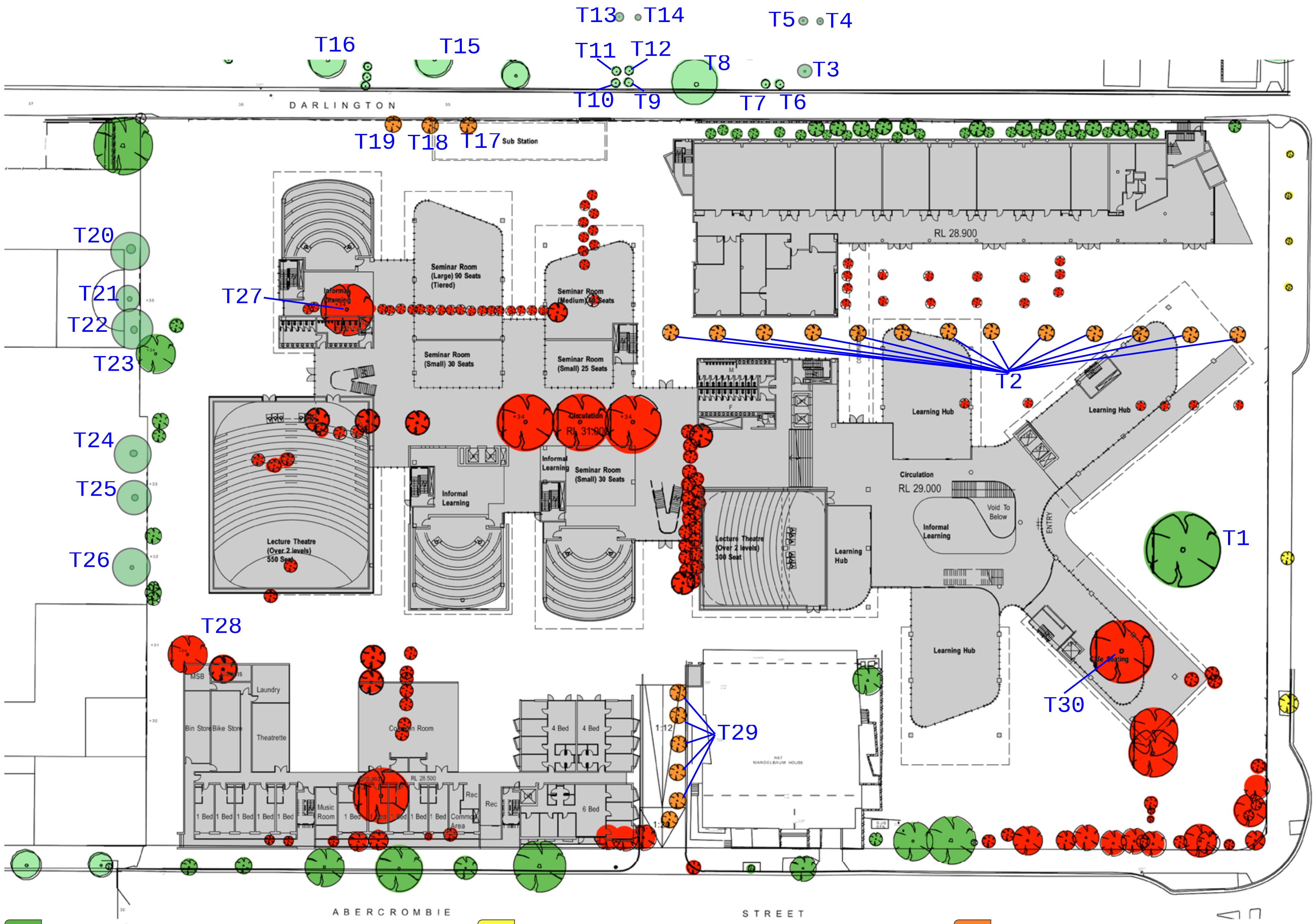
Syzigium paniculatum (Brush Cherry, Magenta Lilly Pilli) is listed on the Schedules of the NSW *Threatened Species Conservation Act 1995*. This species is listed as an endangered species on Schedule 1 of that Act. *Syzygium paniculatum* is also listed as a nationally vulnerable species under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. (NSW Department of Environment and Climate Change (2008).

However, tree numbers 3, 5, 10 and 12 are considered to be a planted specimens rather than remnant vegetation as *Syzygium paniculatum* (Magenta Lily Pilly) is not recorded as occurring naturally at this locality. (NSW Department of Environment and Climate Change 2008). Taking this into account it is considered that there will not be a significant impact on threatened species arising from the proposal when applying the relevant test under Section 5A of the Environment Planning and Assessment Act 1979.

In addition, *Eucalyptus scoparia* (Wallangara White Gum, Willow Gum) is listed on the Schedules of the NSW *Threatened Species Conservation Act 1995*. This species is listed as an endangered species in Part 1 Schedule 1 of that Act. *Eucalyptus scoparia* is also listed as a nationally vulnerable species under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999.*

However, tree numbers 26 and 28 are considered to be planted specimens rather than remnant vegetation as *Eucalyptus scoparia* (Wallangara White Gum, Willow Gum) is not recorded as occurring naturally at this locality. (NSW Department of Environment and Climate Change 2008). Taking this into account it is considered that there will not be a significant impact on threatened species if removal of tree number 28 proceeds (when applying the relevant test under Section 5A of the Environment Planning and Assessment Act 1979).

The tree locations are identified in Figure 2 which comprises an extract from the Tree Protection Plan prepared by 360° dated April 2012 and identified as sheet 7 of 8. Tree numbers 3, 20, 21, 22, 24, 25 and 26 have been added to the plan and are approximate locations only (not to survey).



LEGEND

- TREES TO BE RETAINED AND PROTECTED
- TREES TO BE REPLACED WITH SPECIES IN ACCORDANCE WITH THE CITY STREET TREE MASTERPLAN
- TREES TO BE RELOCATED AND PLANTED ELSEWHERE ON THE SITE
- TREES TO BE REMOVED

RETAINED & PROTECTED

The revised building design accommodates the retention of the majority of trees identified as being of high significance and those of good health. The mature Sydney Blue Gum (Eucalyptus saligna) located near Rose Street has been retained and celebrated as part of the design, with proposed works confirmed not to encroach on the 12m tree protection radius.

In accordance with the latest Arborcultural Impact Report prepared by Landscape Matrix, all trees identified as having a high retention value (1) are to be protected. These include a Sydney blue gum and Holm Oak located on the northern side of Darlington Lane, a Sydney Blue Gum, Spotted Gums Wallangarra White Gums and a Lemon Scented Gum along the boundary of the adjacent school and the avenue of Frangipanis and Populars along Darlington Lane next to the economics building.

REPLACED

These are trees indicated to be of poor existing health and habit and are species which don't comply with those outlined in the City of Sydney Street Tree Masterplan (CSSTM). The specimens identified will be removed and replaced with the correct species in accordance with the CSSTM.

Currently the existing street trees along Abercrombie Street are comprised predominantly of Liquidamber styraciflua (liquidambar), and a Lophostemon confertus (Brush box). According to the CSSTM, the replacement species for Abercrombie Street is Nyssa sylvatica (Tupelo). Because of the size and significance of the existing trees it is proposed to retain them.

There are two Liquidambar street trees at the eastern end of Codrington Street which are of poor form and show signs of root damage. To the north of Codrington Street there are several Harpullia pendulas (Tulipwood) which have been recently planted. According to the CSSTM, the replacement species for Codrington Street is Eucalyptus sideroxylon (Ironbark).

RELOCATED

Trees as identified in both Arborist Reports as being of moderate landscape significance and in good health shall be relocated elsewhere on site as recommended in the reports.

* On the northern side of Rose Street in front of the existing economics building is a row of Flindersia australis (Crows Ash). Because of their conflict with the proposed development they are to be transplanted to the western boundary establishing a visual buffer between the development and Darlington School.

* Located between Mandelbaum House and the Shephard Centre exist another row of semi-mature Flindersia australis. Because of their conflict with the proposed development they are to be transplanted to the western boundary establishing a visual buffer between the development and Darlington School.

* On the southern side of Darlington Lane exist 3 Fraxinus raywood (Claret Ash) which are in good health and of moderate landscape value. Proposed upgrades to Darlington Lane compromise the health of these specimens, in order to preserve these trees, they shall be transplanted, stored and replanted within the southern pedestrian corridor.

REMOVED

Both arborcultural reports have identified several trees within the site to be of poor health, low significance value. The report prepared by Landscape Matrix states that 'due to the long history of past developments and use of the land it is considered most probable that none of the trees are remnants of the original vegetation of the locality and comprises planted specimens in addition to some weed species'. These trees shall be removed as part of the development.

There are 2 trees included amongst these that have been noted as having high significance value. These include a Corymbia citriodora (Lemon Scented Gum) located to the South of Boundary Lane immediately adjacent to several structures including Boundary Lane roadway, a building and a drainage culvert, the other is a Eucalptus scoparia (Wallangarra White Gum) Located in the centre of the existing child care centre. The specimens due to their proximity to existing structures and conflict with the proposed building are designated for removal.

NOTES:	Iss.	Amendment	Date	By
	A	Part 3A	04/04/12	LB

DWG. TITLE **Tree Retention and Protection Plan**
PROJECT **THE UNIVERSITY OF SYDNEY Business School Redevelopment**

DATE APRIL 2012 | SHEET 7 of 8 | CHECKED DB | SCALE 1:750 @ A3 | DRAWN LB | ISSUE DA

360°

LP-3A-07

3. 2 OBSERVATIONS REGARDING THE SITE

The following observations are made in regard to the site:

- The site is located in Darlington and is bounded by Darlington Road to the north, Codington Street to the east, Abercrombie Street to the south and Darlington Public School and Golden Grove Street to the west.
- The site has been developed in the past and comprises university, residential and other buildings and vehicle and pedestrian access ways with a large number of semi mature to mature trees;
- Due to the long history of past development and use of the land it is considered most probable that none of the trees are remnants of the original vegetation of the locality and comprises planted specimens in addition to some weeds species (e.g. Chinese Hackberry).

Figure 3: Illustrating the row of Crows Ash trees (tree number 2) in Rose Street and the adjacent Economics and Business building.

3. 3 OBSERVATIONS REGARDING THE TREES ASSESSED FOR THE REPORT

The following general observations are made in regard to the trees assessed for this report:

- 30 trees have been assessed for this report;
- The trees are considered to be planted specimens due to the long history of past development and use of the land;
- Tree numbers 3, 5, 10 and 12 (*Syzygium paniculatum* - Magenta Lily Pilly) and tree numbers 26 and 28 (*Eucalyptus scoparia* - Wallangara White Gum, Willow Gum) are listed individually as a threatened species under the NSW Threatened Species Conservation Act 1995 and the Commonwealth Environment Protection

and Biodiversity Conservation Act 1999. However, these 6 trees are considered to be planted specimens rather than remnant vegetation as these species are not recorded as occurring naturally at this locality. (NSW Department of Environment and Climate Change 2008). Taking this into account it is considered that there will not be a significant impact on threatened species if removal of tree number 28 proceeds (when applying the relevant test under Section 5A of the Environment Planning and Assessment Act 1979).

4. TREE RETENTION VALUES AND ASSESSEMENT SUMMARY

4.1 INTRODUCTION

Using the methodologies referred to in section 2 of this report the trees can be categorised according to a number of criteria. Of particular interest is the criteria related to:

- Health
- Maturity
- Landscape Significance; and
- Safe Useful Life Expectancy (SULE)

By combining assessment criteria it is possible to identify those trees to which greater consideration should be given in the design process. For example, those trees that are identified as being of both medium to long SULE and high landscape significance should be the first priority for retention in the design process. In contrast those trees of high landscape significance but short SULE should not be a significant consideration in the design process as they would only be suitable for retention in the short term.

The same principle can be used to identify those trees of moderate or moderate to high landscape significance and medium to long SULE as trees that should be considered for retention if possible in the design process.

In addition, this process can be used to identify trees that should be removed from the site, regardless of any development proposals, due to declining health, structural issues (e.g. risk of failure) or unsuitability to the site (e.g. invasive weed species).

Using this process of categorisation for the trees assessed has identified

- 9 trees are identified as a priority for retention;
- 16 trees were identified for considered for retention;
- The remaining 5 trees were not identified as being of specific design consideration.

Seven of the 9 trees identified as being a priority for retention are being retained and 15 of the 16 trees identified for considered for retention are either being retained and protected or are proposed to be transplanted.

The following table 2 on pages 14 to 18 provides a summary of the trees assessed for this report including their relative retention values.

Once trees have been identified for retention it is important to identify the spatial constraints to development that retention of the trees will require. The spatial constraints relate to protection of a minimum area required for the root zone requirements of the tree and protection of the trees' existing/future canopy growth.

The tree protection zones required to provide for the retention of these trees have been derived using the criteria specified in AS4970-2009 and are identified in table 2.

Generic tree protection measures are identified in the recommendations to provide guidance on likely measures that will be required prior to and during the construction process to minimise risk of damage to trees identified for retention on the site.

4.2 SUMMARY OF TREES ASSESSED (INCLUDING RETENTION VALUE AND PROTECTION ZONES UNDER AS4970-2009)

Table 2 provides a summary of the trees assessed for this report. Further details regarding the trees' health, condition and other factors are provided in the tree data summary (Appendix B).

Table 2: Trees identified as a priority for consideration for retention/protection with identified Tree Protection Zones (TPZ).

TREE NO.	SCIENTIFIC AND COMMON NAME	COMMENTS	RET. VALUE	TPZ *	SRZ **
1	*Eucalyptus saligna* (Sydney Blue Gum)	A mature, single trunked specimen approximately 26 metres in height with a canopy spread of 22x23 metres and a diameter at breast height (DBH) of 1020mm. In good health and of significant landscape value. At the time of inspection the tree exhibited low levels of dieback in the outer canopy areas. Located in the middle of a group of demountable buildings with deck areas 1.6 to 2.5 metres form the tree on all sides and the majority of its tree protection zone shadowed by buildings, pathways etc, including pathways now located underneath the demountable buildings.	1	12.2 (metres)	3.6 (metres)
2	*Flindersia australis* (Crows Ash, Australian Teak) x 13 specimens	A row of 13 semi mature, single trunked specimens up to 7 in height with canopy spreads of up to 4 metres and DBH of up to 190mm. In good health and of moderate landscape significance.	2	3.2 (metres)	1.9 (metres)
3	*Syzigium paniculatum* (Brush Cherry, Magenta Lilli Pilli)	A mature, single trunked specimen approximately 9 metres in height with a canopy spread of 6x8 metres and a DBH of 340mm. In good health and of moderate to high landscape value. The tree exhibits fair branch attachment with codominant leaders from 2 metres with some evidence of poor attachment at the junction - while not considered at risk of failure in the near future the junction of leaders is a weak point in the tree with increased risk of failure.	2	4.1 (metres)	2.2 (metres)
4	*Mangifera indica* (Mango)	A mature, twin trunked specimen approximately 8 metres in height with a canopy spread of 6 metres and DBH of 350 and 350mm. In good health and of moderate landscape value.	2	6.3 (metres)	2.6 (metres)
5	*Syzigium paniculatum* (Brush Cherry, Magenta Lilli Pilli)	A mature, single trunked specimen approximately 8.5 metres in height with a canopy spread of 5 metres and a DBH of 270mm. In good health and of moderate landscape value. Continued next page…	2	3.2 (metres)	2 (metres)

		The tree exhibits fair branch attachment with 3 codominant leaders from 2 metres with evidence of poor attachment at the junction - while not considered at risk of failure in the near future the junction of leaders is a weak point in the tree with increased risk of failure.			
6	*Elaeocarpus reticulatus* (Blueberry Ash)	A mature, single trunked specimen approximately 8 metres in height with a canopy spread of 5 metres and a DBH of 200mm. In good health and of moderate landscape value. The tree's past canopy development has been suppressed.	2	2.4 (metres)	1.8 (metres)
7	*Elaeocarpus reticulatus* (Blueberry Ash)	A mature, single trunked specimen approximately 8 metres in height with a canopy spread of 5x9 metres and a DBH of 170mm. In good health and of moderate landscape value. The tree's past canopy development has been suppressed.	2	2 (metres)	1.7 (metres)
8	*Eucalyptus saligna* (Sydney Blue Gum)	A mature, single trunked specimen approximately 18 metres in height with a canopy spread of 17 metres and a DBH of 720mm. In good health and of high landscape value.	1	8.6 (metres)	3 (metres)
9	*Elaeocarpus reticulatus* (Blueberry Ash)	A mature, single trunked specimen approximately 6 metres in height with a canopy spread of 5 metres and a DBH of 140mm. In good health and of low to moderate landscape value. The tree's past canopy development has been significantly suppressed.	3	2*** (metres)	1.6 (metres)
10	*Syzigium paniculatum* (Brush Cherry, Magenta Lilli Pilli)	A mature, single trunked specimen approximately 10 metres in height with a canopy spread of 7 metres and a DBH of 320mm. In good health and of moderate to high landscape value. The tree exhibits fair branch attachment with multiple codominant leaders from 1.8 metres with some evidence of poor attachment at the junction - while not considered at risk of failure in the near future the junction of leaders is a weak point in the tree with increased risk of failure. Torn 1st order branch at 1.7 metres on the east side requires pruning back to junction with trunk.	2	3.8 (metres)	2.2 (metres)
11	*Elaeocarpus reticulatus* (Blueberry Ash)	A mature, single trunked specimen approximately 7 metres in height with a canopy spread of 3x4 metres and a DBH of 160mm. In good health and of low to moderate landscape value. The tree's past canopy development has been significantly suppressed.	3	2*** (metres)	1.6 (metres)

12	*Syzigium paniculatum* (Brush Cherry, Magenta Lilli Pilli)	A mature, single trunked specimen approximately 9 metres in height with a canopy spread of 4 metres and a DBH of 180mm. In good health and of moderate landscape value.	2	2.2 (metres)	1.6 (metres)
13	*Acmena smithii* (Lilly Pilly)	A mature, multi trunked specimen approximately 9 metres in height with a canopy spread of 4x5 metres and DBH of up to 110mm. In good health and of low to moderate landscape value. The tree exhibits fair branch attachment with multiple codominant leaders with some evidence of poor attachment at the junction not considered at risk of failure in the near future. Torn 1st order branch at 1.7 metres on the east side requires pruning back to junction with trunk.	3	4 (metres)	2.1 (metres)
14	*Celtis sinensis* (Chinese Celtis)	A mature, twin trunked specimen approximately 13 metres in height with a canopy spread of 12metres and DBH of 230 and 280mm. In good health and an environmental pest species of moderate visual significance. The tree exhibits fair to poor branch attachment with codominant leaders from 1.3 metres with evidence of poor attachment at the junction - the junction of leaders is a weak point in the tree with increased risk of failure - the risk of failure will increase as the canopy grows.	3	4.7 (metres)	2.3 (metres)
15	*Quercus ilex* (Holly Oak, Holm Oak)	A mature, single trunked specimen approximately 13 metres in height with a canopy spread of 13 metres and a DBH of ca. 900mm at 1 metre. In good health and of high landscape value. The tree exhibits multiple leaders from 1.5 metres but appears structurally sound - the tree was inspected from the property boundary in Darlington Lane - a more thorough inspection of the tree's structure from within the property is recommended.	1	10.8 (metres)	3.3 (metres)
16	*Robinia pseudoacacia* 'Frisia' (Golden Robinia)	A mature, single trunked specimen approximately 8 metres in height with a canopy spread of 10 metres and a DBH of ca 330mm at 1 metre. In good health and of moderate landscape value. The tree was inspected from the property boundary in Darlington Lane - a more thorough inspection of the tree's structure from within the property is recommended.	2	4 (metres)	2.2 (metres)
17	*Fraxinus Raywood* (Claret Ash)	A mature, single trunked specimen approximately 7 metres in height with a canopy spread of 7 metres and a DBH of 270mm. In good health and of moderate landscape value.	2	3.2 (metres)	2 (metres)

18	*Fraxinus Raywood* (Claret Ash)	A mature, single trunked specimen approximately 6 metres in height with a canopy spread of 6 metres and a DBH of 250mm at 1 metre. In good health and of moderate landscape value.	2	3 (metres)	1.8 (metres)
19	*Fraxinus Raywood* (Claret Ash)	A mature, single trunked specimen approximately 7 metres in height with a canopy spread of 7 metres and a DBH of 270mm. In good health and of moderate landscape value.	2	3.2 (metres)	1.9 (metres)
20	*Eucalyptus saligna* (Sydney Blue Gum)	A mature, single trunked specimen approximately 9 metres in height with a canopy spread of 6 metres and a DBH of 260mm. In good health and of low to moderate landscape value. Located within Darlington Public School.	3	3.1 (metres)	2 (metres)
21	*Eucalyptus saligna* (Sydney Blue Gum)	A mature, single trunked specimen approximately 17 metres in height with a canopy spread of 11 metres and a DBH of 350mm. In good health and of high landscape value. Located within Darlington Public School.	1	4.2 (metres)	2.3 (metres)
22	*Corymbia maculata* (Spotted Gum)	A mature, single trunked specimen approximately 18 metres in height with a canopy spread of 7 metres and a DBH of 360mm. In good health and of high landscape value. Located within Darlington Public School.	1	4.3 (metres)	2.3 (metres)
23	*Casuarina glauca* (Swamp Oak)	A mature, single trunked specimen approximately 12 metres in height with a canopy spread of 7 metres and a DBH of 350mm. In good health and of moderate to high landscape value. Located at the boundary of the site with Darlington Public School. Evidence of past mechanical damage to trunk at 1.5 metres on SW. Lower/basal trunk examination limited by vegetation/limited access.	2	4.2 (metres)	2.3 (metres)
24	*Corymbia maculata* (Spotted Gum)	A mature, single trunked specimen approximately 22 metres in height with a canopy spread of 12 x 17 metres and a DBH of 700mm. In good health and of high landscape value. Located within Darlington Public School. Evidence of possible damage to trunk at 8 metres in past with multiple leaders from this point - recommended this area be inspected (aerial inspection) when works are being carried out on trees in the School. Birds nest in junction at 8 metres.	1	8.4 (metres)	3.2 (metres)

25	*Pinus radiata* (Monterey Pine)	A mature, single trunked specimen approximately 10 metres in height with a canopy spread of 9 x 11 metres and a DBH of 540mm. In good health and of moderate landscape value. Located within Darlington Public School. At the time of inspection the tree was of fair vigour and exhibited reduced foliage density and low to moderate levels of dieback.	2	6.5 (metres)	2.7 (metres)
26	*Eucalyptus scoparia* (Wallangarra White Gum)	A mature, single trunked specimen approximately 14 metres in height with a canopy spread of 12 metres and a DBH of 380mm. In good health and of high landscape value. Located within Darlington Public School.	1	4.6 (metres)	2.3 (metres)
27	*Corymbia maculata* (Spotted Gum)	A mature, single trunked specimen approximately 12 metres in height with a canopy spread of 7 metres and a DBH of 410mm. In good health and of moderate to high landscape value.	2	4.9 (metres)	2.4 (metres)
28	*Eucalyptus scoparia* (Wallangarra White Gum)	A mature, single trunked specimen approximately 12 metres in height with a canopy spread of 10 metres and a DBH of ca. 600mm. In good health and of high landscape value. Located within Childcare Centre. At the time of inspection the tree was of fair vigour and exhibited low levels of dieback.	1	7.2 (metres)	2.9 (metres)
29	*Flindersia australis* (Crows Ash, Australian Teak) x 5 specimens	A row of 5 semi mature, single trunked specimens up to 8 in height with canopy spreads of up to 4 metres and DBH of up to 220mm. In good health and of moderate landscape significance.	2	2.6 (metres)	1.9 (metres)
30	*Corymbia citriodora* (Lemon Scented Gum)	A mature, single trunked specimen approximately 18 metres in height with a canopy spread of 21 metres and a DBH of 870mm. In good health and of high landscape value. The tree exhibits fair branch attachment with codominant leaders form 4.5 metres with some evidence of poor attachment at the junction - - while not considered at risk of failure in the near future the junction of leaders is a weak point in the tree with increased risk of failure. The tree is located immediately adjacent to several structures including the Boundary Lane roadway, a building and a drainage culvert.	1	10.4 (metres)	2.8 (metres)

*TPZ = Tree protection zone under AS4970-2009
**SPZ = Structural zone under AS4970-2009
*** Minimum TPZ under AS4970-2009

5. IMPACT ANALYSIS OF PROPOSED WORKS

The potential impacts of the proposal have been assessed using the following plans:
Level 1 Plan prepared by Woods Bagot Pty Ltd, dated April 2012; and
Tree Protection Plan prepared by 360° dated April 2012 and identified as sheet 7 of 8.

5.1 TREES REQUIRING REMOVAL OR PROPOSED TO BE REMOVED TO FACILITATE THE PROPOSED DEVELOPMENT WORKS

To facilitate construction of the proposed development works the following 3 trees will require removal or are proposed to be removed for the proposed development works.

The trees proposed to be removed are summarised in table 3 as follows:

Table 3: Trees requiring removal or proposed to be removed to facilitate the proposed development works

TREE NUMBER(S)	SCIENTIFIC AND COMMON NAME	COMMENTS
27	*Corymbia maculata* (Spotted Gum)	Located within the footprint of proposed works (main building) and will require removal.
28	*Eucalyptus scoparia* (Wallangarra White Gum)	Located within the footprint of proposed works (Student accommodation) and will require removal.
30	*Corymbia citriodora* (Lemon Scented Gum)	Located within the footprint of proposed works (main building) and will require removal.

While tree numbers 28 and 30 were identified as being a priority for retention these trees will require removal. However, as noted in this report (and the earlier report of the Tree School) the retention of tree number 30 is not considered practically achievable due to its location immediately adjacent to existing infrastructure. In addition, it is noted that 7 of the 9 trees identified as being a priority for retention are being retained and 15 of the 16 trees identified for considered for retention are either being retained and protected or are proposed to be transplanted.

5.2 TREES POTENTIALLY IMPACTED BY THE PROPOSED DEVELOPMENT WORKS

A significant number of the trees assessed for this report will be remote from the proposed works and will not be impacted - those trees that are remote from the proposed works are tree numbers 3 to 16 and 20 to 26 inclusive.

To facilitate construction of the proposed development works 6 trees (or groups of trees) are proposed for retention in the vicinity of works and may be potentially impacted. These impacts are summarised in table 4 as follows:

The extent of impacts to the trees in table 4 has been rated using the following guideline:
0% of TPZ impacted – no impact of significance
0 to 10% of TPZ impacted – low level of impact
10 to 15% of TPZ impacted – low to moderate level of impact
15 to 20% of TPZ impacted – moderate level of impact
20 to 25% of TPZ impacted – moderate to high level of impact
25 to 35% of TPZ impacted – high level of impact
> 35% of TPZ impacted – significant level of impact

Table 4: Trees potentially affected by the proposed development works

TREE NO	SCIENTIFIC AND COMMON NAME	TPZ	SRZ	COMMENTS*
1	*Eucalyptus saligna* (Sydney Blue Gum)	12.2 metres	3.6 metres	The proposed circulation pathway is located 11.6 metres from the tree and the proposed building is located 15 metres from the tree and outside its identified tree protection zone (TPZ) - the pathway is calculated to potentially encroach within 3.58m^2 or 0.76% of the tree's identified TPZ area - this is a low level of impact and within an acceptable threshold for the tree. Due to the location of proposed structures and the foreseeable need for construction access it is recommended a combination of tree protection fencing and ground protection in accordance with figure 4 of AS4970-2009 be used to protect the TPZ during works.
2	*Flindersia australis* (Crows Ash, Australian Teak) x 13	3.2 metres	1.9 metres	A row of 13 semi mature, single trunked specimens up to 7 in height and within or adjacent to the footprint of the proposed works. These trees are proposed to be transplanted and retained on the site. It is recommended a transplant method statement be prepared for these trees.

17	*Fraxinus Raywood* (Claret Ash)	3.2 metres	2 metres	A mature, single trunked specimen approximately 7 metres in height and adjacent to the footprint of the proposed works. This tree is proposed to be transplanted and retained on the site. It is recommended a transplant method statement be prepared for the tree.
18	*Fraxinus Raywood* (Claret Ash)	3 metres	1.8 metres	A mature, single trunked specimen approximately 6 metres in height and adjacent to the footprint of the proposed works. This tree is proposed to be transplanted and retained on the site. It is recommended a transplant method statement be prepared for the tree.
19	*Fraxinus Raywood* (Claret Ash)	3.2 metres	1.9 metres	A mature, single trunked specimen approximately 7 metres in height and adjacent to the footprint of the proposed works. This tree is proposed to be transplanted and retained on the site. It is recommended a transplant method statement be prepared for the tree.
29	*Flindersia australis* (Crows Ash, Australian Teak) x 5	2.6 metres	1.9 metres	A row of 5 semi mature, single trunked specimens up to 8 in height and within the footprint of the proposed works. These trees are proposed to be transplanted and retained on the site. It is recommended a transplant method statement be prepared for these trees.

* TPZ calculations were made using scale drawings of the trees' TPZs in a CAD program (TurboCAD®) with potentially affected areas added to the drawing.

The impacts of the proposed development works can be summarised as follows:

The impacts of the proposal can be summarised as follows:

- Tree numbers 3 to 16 and 20 to 26 inclusive are remote from the proposed works and will not be impacted - this includes the trees located adjacent to the site in Darlington Public School.
- The proposed works will encroach on less than 1% of the identified tree protection zone of tree number 1 - this is a low level of impact and within an acceptable threshold for the tree. Due to the proximity of the tree's TPZ to works and the foreseeable need for construction access it is recommended a combination of tree protection fencing and ground protection in accordance with figure 4 of AS4970-2009 be used to protect the TPZ during works.
- Tree numbers 2, 17, 18, 19 and 29 are within or adjacent to the footprint of the proposed works and are proposed to be transplanted and retained on site. It is recommended a transplant method statement be prepared for these trees.
- Tree numbers 27, 28 and 30 will require removal as part of the works but proposed tree planting will more than adequately compensate for their removal.

6. CONCUSIONS

6.1 THE SITE

The site is bounded by Darlington Road to the north, Codington Street to the east, Abercrombie Street to the south and Darlington Public School and Golden Grove Street to the west. It has been developed in the past and comprises university, residential and other buildings and vehicle and pedestrian access ways with a large number of semi mature to mature trees.
Due to the long history of past development and use of the land it is considered most probable that none of the trees are remnants of the original vegetation of the locality and comprises planted specimens in addition to some weeds species (e.g. Chinese Hackberry).

6.2 THE TREES

30 trees have been assessed in preparation of this report. These 30 trees had been identified in earlier assessments and submissions as being of significance and include trees on the site and trees within Darlington Public School that adjoin the site. The trees are considered to be planted specimens due to the long history of past development and use of the land.

Two of the species assessed (*Syzygium paniculatum* - Magenta Lily Pilly and *Eucalyptus scoparia* - Wallangara White Gum, Willow Gum) are listed as a threatened species under the NSW Threatened Species Conservation Act 1995 and the Commonwealth Environment Protection and Biodiversity Conservation Act 1999.

However, these trees are considered to be planted specimens rather than remnant vegetation as these species are not recorded as occurring naturally at this locality. (NSW Department of Environment and Climate Change 2008). Taking this into account it is considered that there will not be a significant impact on threatened species if removal of tree number 28 proceeds (when applying the relevant test under Section 5A of the Environment Planning and Assessment Act 1979).

A summary of the trees, including their retention value and protection zones under AS4970-2009, is provided in Table 2 on pages 14 to 18 of the report.

6.3 IMPACTS OF THE PROPOSED DEVELOPMENT WORKS

To facilitate construction of the proposed development works the following 3 trees will require removal or are proposed to be removed for the proposed development works:
Tree # 27 *Corymbia maculata* (Spotted Gum)
Tree # 28 *Eucalyptus scoparia* (Wallangarra White Gum)
Tree # 30 *Corymbia citriodora* (Lemon Scented Gum)

To facilitate construction of the proposed development works the following 6 trees are proposed for retention in the vicinity of works and may be potentially impacted:
Tree # 1 *Eucalyptus saligna* (Sydney Blue Gum)
Tree # 2 *Flindersia australis* (Crows Ash, Australian Teak) x 13

Tree # 17 *Fraxinus Raywood* (Claret Ash)
Tree # 18 *Fraxinus Raywood* (Claret Ash)
Tree # 19 *Fraxinus Raywood* (Claret Ash)
Tree # 29 *Flindersia australis* (Crows Ash, Australian Teak) x 5

The impacts to trees arising from the proposal can be summarised as follows:

- Tree numbers 3 to 16 and 20 to 26 (within Darlington Public School) are remote from the proposed works and will not be impacted by the proposal.

- The proposed works will encroach on less than 1% of the identified tree protection zone of tree number 1 - this is a low level of impact and within an acceptable threshold for the tree. Due to the proximity of the tree's TPZ to works and the foreseeable need for construction access it is recommended a combination of tree protection fencing and ground protection in accordance with figure 4 of AS4970-2009 be used to protect the TPZ during works.

- Tree numbers 2, 17, 18, 19 and 29 are within or adjacent to the footprint of the proposed works and are proposed to be transplanted and retained on site. It is recommended a transplant method statement be prepared for these trees.

- Tree numbers 27, 28 and 30 will require removal as part of the works but proposed tree planting will more than adequately compensate for their removal.

7. RECOMMENDATIONS

7.1 TREE RETENTION AND REMOVAL

It is recommended that:
The trees identified as retention value 1 in table 2 of this report be priorities for retention in the design process;
The trees identified as retention value 2 in table 2 of this report be considered for retention in the design process; and

7.2 TREE PROTECTION ZONES

It is recommended the tree protection zones identified in table 2 be used as the minimum offsets required for tree protection to guide the design process.

7.3 GENERIC TREE PROTECTION MEASURES

The following generic tree protection measures are recommended to assist in minimising potential impacts that may arise during the demolition and construction phases if the precinct is to undergo redevelopment (including the implementation of landscape works on the site).

A. Measures to be implemented prior to the commencement of any works on the site.

1. Tree to be retained are to be clearly identified by signage as protected trees.

2. The tree protection zones of trees to be retained are to be protected by fencing during the entire construction period except for specific areas directly required to achieve construction works.

3. The tree protection fence shall be constructed of galvanised pipe at 2.4 metre spacing and connected by securely attached chain mesh fencing to a minimum height of 1.8 metres and shall be installed prior to work commencing.

4. The tree protection fencing shall be installed as closely as possible to the alignment of the identified tree protection zone and shall be approved and certified by the site arborist prior to commencement of any construction or demolition works on the site.

B. Measures to be implemented and maintained during the life of construction works on the site.

5. Any excavation within the identified root protection zones of trees to be retained shall be carried out by hand to minimize disturbance to tree roots. Roots greater than 25mm are not to be damaged or severed without prior assessment by an arborist to determine likely level of impact and the restorative actions required to minimise the impacts of root damage.

6. Tree roots between 10mm and 25mm diameter, severed during excavation, shall be cut cleanly by hand by an experienced Arborist/Horticulturist with a minimum qualification of the Horticulture Certificate or Tree Surgery Certificate.

7. The following activities/actions are prohibited from the tree protection zones:

- Soil cut or fill including excavation and trenching
- Soil cultivation, disturbance or compaction
- Stockpiling storage or mixing of materials
- The parking, storing, washing and repairing of tools, equipment and machinery
- The disposal of liquids and refueling
- The disposal of building materials
- The sitting of offices or sheds
- Any action leading to the impact on tree health or structure

8. Canopy pruning of trees identified for protection which is necessary to accommodate approved building works shall be undertaken by an experienced Horticulturist/ Arborist, with a minimum qualification of the Horticulture Certificate or Tree Surgery Certificate and in accordance with Australian Standard 4373-2007 'Pruning of Amenity Trees'.

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Director
Landscape Matrix Pty Ltd
5 April 2012

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APPENDIX A: PHOTOGRAPHS

Photograph 1: Tree # 1 - Illustrating the location of the tree within the area of demountable buildings facing Codrington Street.

Photograph 2: Tree # 2 - Illustrating location and context of the trees within the footpath area of Rose Street.

Photograph 3: Tree #s 20 to 23 - Illustrating the location of the trees within the adjoining school grounds.

Photograph 4: Tree #s 24 to 26 - Illustrating the location of the trees within the adjoining school grounds.

Photograph 5: Tree #s 17, 18 and 19 - Illustrating the location and context of these trees.

Photograph 6: Tree # 30 - Illustrating the location and context of the tree.

APPENDIX B - TREE DATA SUMMARY - SYDNEY UNIVERSITY ABERCROMBIE PRECINCT

Tree No.	*Genus, Species* (Common Name)	Height (m)	Canopy (m)	DBH (mm)	DBH for TPZ	DGL for SRZ	Foliage Condition	Age Class	Trunk	Trunk Lean	Crown balance	Past Pruning	Stability	Branch Attachment	Health	Vigour	Dead Wood	Pest or disease	SULE	Landscape Significance	Retention Value*	Comments
1	*Eucalyptus saligna* (Sydney Blue Gum)	26	22 x 23	1020	1020	1250	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	Lower limbs pruned to 8 metres on NE in past	Appears stable	Fair branch attachment	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	High to significant in landscape	1	At the time of inspection the tree exhibited low levels of dieback in the outer canopy areas. Located in the middle of a group of demountable buildings wit deck areas 1.6 to 2.5 metres form the tree on all sides and the majority of its tree protection zone shadowed by buildings, pathways etc, including pathways now located underneath the demountable buildings.
2	*Flindersia australis* (Crows Ash, Australian Teak) x 13	Up to 7 metres	Up to 4	Up to 190	270	270	Good foliage condition	Semi mature	Twin and multi trunked	Upright trunk	Balanced canopy area	Lower limbs pruned to 1.8 metres in past	Appears stable	Sound branch attachment	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	Moderate landscape significance	2	A row 13 semi mature specimens.
3	*Syzigium paniculatum* (Brush Cherry, Magenta Lilli Pilli)	9	6 x 8	340	340	390	Good foliage condition	Mature	Single trunk	Upright trunk	Majority of canopy to the NE	Lower limbs pruned to 3.5 metres in past	Appears stable	Fair branch attachment	Good health	Good vigour	<5%	No evidence of significant pest nor disease	2 Medium (15 to 40 years)	Moderate to high landscape significance	2	The tree exhibits fair branch attachment with codominant leaders from 2 metres with some evidence of poor attachment at the junction - while not considered at risk of failure in the near future the junction of leaders is a weak point in the tree with increased risk of failure.
4	*Mangifera indica* (Mango)	8	6	Ca 350, 350	525	585	Good foliage condition	Mature	Twin trunked	Upright trunk	Balanced canopy area	Lower limbs pruned to 3 metres in past	Appears stable	Sound branch attachment	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	Moderate landscape significance	2	
5	*Syzigium paniculatum* (Brush Cherry, Magenta Lilli Pilli)	8.5	5	Ca 270	270	300		Mature	Single trunk	Upright trunk	Balanced canopy area	Lower limbs pruned to 3 metres in past	Appears stable	Fair branch attachment	Good health	Good vigour	<5%	No evidence of significant pest nor disease	2 Medium (15 to 40 years)	Moderate landscape significance	2	The tree exhibits fair branch attachment with 3 codominant leaders from 2 metres with evidence of poor attachment at the junction - while not considered at risk of failure in the near future the junction of leaders is a weak point in the tree with increased risk of failure.
6	*Elaeocarpus reticulatus* (Blueberry Ash)	8	5	200	200	220	Good foliage condition	Mature	Single trunk	Slight trunk lean to NE	Majority of canopy to the NE	Lower limbs pruned to 2.5 metres in past	Appears stable	Sound branch attachment	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	Moderate landscape significance	2	The tree's past canopy development has been suppressed.
7	*Elaeocarpus reticulatus* (Blueberry Ash)	8	5 x 9	170	170	200	Good foliage condition	Mature	Single trunk	Upright trunk	Majority of canopy to the South	Lower limbs pruned to 2.5 metres in past	Appears stable	Sound branch attachment	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	Moderate landscape significance	2	The tree's past canopy development has been suppressed.
8	*Eucalyptus saligna* (Sydney Blue Gum)	18	17	640 x 800	720	770	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	Lower limbs pruned to 2.5 metres in past	Appears stable	Fair branch attachment	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	High landscape significance	1	
9	*Elaeocarpus reticulatus* (Blueberry Ash)	6	5	140	140	170	Good foliage condition	Mature	Single trunk	Distinct trunk lean to NE	All of canopy to the NE	Lower limbs pruned to 1.4 metres in past	Appears stable	Sound branch attachment	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	Low to moderate landscape significance	3	The tree's past canopy development has been significantly suppressed.
10	*Syzigium paniculatum* (Brush Cherry, Magenta Lilli Pilli)	10	7	320	320	370	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	Lower limbs pruned to 3 metres in past	Appears stable	Fair branch attachment	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	Moderate to high landscape significance	2	The tree exhibits fair branch attachment with multiple codominant leaders from 1.8 metres with some evidence of poor attachment at the junction - while not considered at risk of failure in the near future the junction of leaders is a weak point in the tree with increased risk of failure. Torn 1st order branch at 1.7 metres on the east side requires pruning back to junction with trunk.
11	*Elaeocarpus reticulatus* (Blueberry Ash)	7	3 x 4	160	160	180	Good foliage condition	Mature	Single trunk	Distinct trunk lean to West	Majority of canopy to the West	Lower limbs pruned to 4 metres in past	Appears stable	Sound branch attachment	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	Low to moderate landscape significance	3	The tree's past canopy development has been significantly suppressed.
12	*Syzigium paniculatum* (Brush Cherry, Magenta Lilli Pilli)	9	4	180	180	190	Good foliage condition	Mature	Twin trunked	Upright trunk	Majority of canopy to the NW	Lower limbs pruned to 3 metres in past	Appears stable	Sound branch attachment	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	Moderate landscape significance	2	
13	*Acmena smithii* (Lilly Pilly)	9	4 x 5	Up to 110	330	330	Good foliage condition	Mature	Multi trunked	Upright trunk	Majority of canopy on an NE x SW axis	Lower limbs pruned to 3 metres in past	Appears stable	Fair branch attachment	Good health	Good vigour	5%	No evidence of significant pest nor disease	2 Medium (15 to 40 years)	Low to moderate landscape significance	3	The tree exhibits fair branch attachment with multiple codominant leaders with some evidence of poor attachment at the junction not considered at risk of failure in the near future. Torn 1st order branch at 1.7 metres on the east side requires pruning back to junction with trunk.
14	*Celtis sinensis* (Chinese Celtis)	13	12	230, 280	390	420	Good foliage condition	Mature	Twin trunked	Upright trunk	Majority of canopy to the NW	Lower limbs pruned to 3 metres in past	Appears stable	Fair to poor branch attachment	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	Environmental pest species of moderate visual significance	3	The tree exhibits fair to poor branch attachment with codominant leaders from 1.3 metres with evidence of poor attachment at the junction - the junction of leaders is a weak point in the tree with increased risk of failure - the risk of failure will increase as the canopy grows.

Tree No.	*Genus, Species* (*Common Name*)	Height (m)	Canopy (m)	DBH (mm)	DBH for TPZ	DGL for SRZ	Foliage Condition	Age Class	Trunk	Trunk Lean	Crown balance	Past Pruning	Stability	Branch Attachment	Health	Vigour	Dead Wood	Pest or disease	SULE	Landscape Significance	Retention Value*	Comments
15	*Quercus ilex* (Holly Oak, Holm Oak)	13	13	Ca 900 at 1 metre	900	990	Good foliage condition	Mature	Single trunk	Slight trunk lean to North for 1 metre	Balanced canopy area	Lower limbs pruned to 4 metres in past	Appears stable	Sound branch attachment	Good health	Good vigour	<5%		1 Long (> 40 years)	High landscape significance	1	The tree exhibits multiple leaders from 1.5 metres but appears structurally sound - the tree was inspected from the property boundary in Darlington Lane - a more thorough inspection of the tree's structure from within the property is recommended.
16	*Robinia pseudoacacia* 'Frisia' (Golden Robinia)	8	10	Ca 330 at 1 metre	330	370	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	Lower limbs pruned to 2 metres, mid branches pruned for street light on SW in past	Appears stable	Sound branch attachment	Good health	Fair vigour	5%	No evidence of significant pest nor disease	1 Long (> 40 years)	Moderate landscape significance	2	The tree was inspected from the property boundary in Darlington Lane - a more thorough inspection of the tree's structure from within the property is recommended.
17	*Fraxinus Raywood* (Claret Ash)	7	7	270	270	300	Very good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	No evidence of significant past pruning	Appears stable	Fair branch attachment	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	Moderate landscape significance	2	
18	*Fraxinus Raywood* (Claret Ash)	6	6	250 at 1 metre	250	250	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	No evidence of significant past pruning	Appears stable	Fair branch attachment	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	Moderate landscape significance	2	
19	*Fraxinus Raywood* (Claret Ash)	7	7	270	270	270	Very good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	No evidence of significant past pruning	Appears stable	Fair branch attachment	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	Moderate landscape significance	2	
20	*Eucalyptus saligna* (Sydney Blue Gum)	9	6	240 x 280	260	290	Good foliage condition	Semi Mature	Single trunk	Upright trunk	Majority of canopy to the NW	No evidence of significant past pruning	Appears stable	Fair branch attachment	Good health	Good vigour	5%	No evidence of significant pest nor disease	1 Long (> 40 years)	Low to moderate landscape significance	3	Located within Darlington Public School.
21	*Eucalyptus saligna* (Sydney Blue Gum)	17	11	350	350	440	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	No evidence of significant past pruning	Appears stable	Fair branch attachment	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	High landscape significance	1	Located within Darlington Public School.
22	*Corymbia maculata* (Spotted Gum)	18	7	360	360	440	Good foliage condition	Mature	Single trunk	Upright trunk	Majority of canopy to the East	No evidence of significant past pruning	Appears stable	Fair branch attachment	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	High landscape significance	1	Located within Darlington Public School.
23	*Casuarina glauca* (Swamp Oak)	12	7	350	350	400	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	No evidence of significant past pruning	Appears stable	Sound branch attachment	Good health	Good vigour	<5%	No evidence of significant pest nor disease	2 Medium (15 to 40 years)	Moderate to high landscape significance	2	Located at the boundary of the site with Darlington Public School. Evidence of past mechanical damage to trunk at 1.5 metres on SW. Lower/basal trunk examination limited by vegetation/limited access.
24	*Corymbia maculata* (Spotted Gum)	22	12 x 17	700	700	900	Good foliage condition	Mature	Single trunk	Upright trunk	Majority of canopy on an North x South axis	No evidence of significant past pruning	Appears stable	Fair branch attachment	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	High landscape significance	1	Located within Darlington Public School. Evidence of possible damage to trunk at 8 metres in past with multiple leaders from this point - recommended this area be inspected (aerial inspection) when works are being carried out on trees in the School. Birds nest in junction at 8 metres.
25	*Pinus radiata* (Monterey Pine)	10	9 x 11	540	540	590	Fair foliage condition	Mature	Single trunk	Slight trunk lean to South	Balanced canopy area	Lower limbs pruned to 3 metres in past	Appears stable	Sound branch attachment	Good health	Fair vigour	5%	No evidence of significant pest nor disease	2 Medium (15 to 40 years)	Moderate landscape significance	2	Located within Darlington Public School. At the time of inspection the tree was of fair vigour and exhibited reduced foliage density and low to moderate levels of dieback.
26	*Eucalyptus scoparia* (Wallangarra White Gum)	14	12	380	380	440	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	No evidence of significant past pruning	Appears stable	Fair branch attachment	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	High landscape significance	1	Located within Darlington Public School.
27	*Corymbia maculata* (Spotted Gum)	12	7	410	410	480	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	Lower limbs pruned to 2.5 metres in past	Appears stable	Fair branch attachment	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	Moderate to high landscape significance	2	
28	*Eucalyptus scoparia* (Wallangarra White Gum)	12	10	Ca 600	600	750	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	No evidence of significant past pruning	Appears stable	Fair branch attachment	Good health	Fair vigour	5%	No evidence of significant pest nor disease	2 Medium (15 to 40 years)	High landscape significance	1	Located within Childcare Centre. At the time of inspection the tree was of fair vigour and exhibited low levels of dieback.
29	*Flindersia australis* (Crows Ash, Australian Teak) x 5	8	Up to 4	Up to ca 220	220	280	Good foliage condition	Semi mature	Single trunk	Upright trunk	Balanced canopy area	Lower limbs pruned to 1.6 metres in past	Appears stable	Sound branch attachment	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	Moderate landscape significance	2	A row of 5 semi mature specimens.
30	*Corymbia citriodora* (Lemon Scented Gum)	18	21	870	870	700	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area			Fair branch attachment	Good health	Good vigour	<5%	No evidence of significant pest nor disease	2 Medium (15 to 40 years)	High landscape significance	1	The tree exhibits fair branch attachment with codominant leaders form 4.5 metres with some evidence of poor attachment at the junction - - while not considered at risk of failure in the near future the junction of leaders is a weak point in the tree with increased risk of failure. The tree is located immediately adjacent to several structures including the Boundary Lane roadway, a building and a drainage culvert.

ca = approximate diameter at breast height (DBH) estimated from nearest property boundary or fence where trees were located on adjoining properties

* Retention Values: 1 - High (Priority for retention); 2 - Moderate (Consider for retention); 3 - Low or short Sule (Not warranting specific design consideration) and 4 - Remove (very short SULE, structurally unsound, weed species etc)

APPENDIX C: SULE CATEGORIES

SULE CATEGORIES AND SUB-CATEGORIES

	1	2	3	4	5
	Long SULE:	**Medium SULE:**	**Short SULE:**	**Remove:**	**Small, Young or regularly clipped:**
	Trees that appeared to be retainable at the time of assessment for more than 40 years with and acceptable level of risk	Trees that appeared to be retainable at the time of assessment for 15 to 40 years with and acceptable level of risk	Trees that appeared to be retainable at the time of assessment for 5 to 15 years with and acceptable level of risk	Trees that should be removed within the next 5 years	Trees that can be reliably transplanted or replaced
A	Structurally sound trees located in positions that can accommodate future growth	Trees that may only live for between 15 and 40 more years	Trees that may only live for between 5 and 15 more years	Dead, dying, supressed or declining trees through disease or inhospitable conditions	Small trees less than 5 metres in height
B	Trees that could be made suitable for retention in the long term by remedial Care	Trees that may live for more than 40 years, but would need to be removed for safety or nuisance reasons	Trees that may live for more than 15 years, but would need to be removed for safety or nuisance reasons	Dangerous trees through instability or recent losss of adjacent trees	Young trees less than 15 years old but over 5 metres in height
C	Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long term retention	Trees that may live for more than 40 years, but should be removed to prevent interference with more suitable individuals or to provide space for new planting	Trees that may live for more than 15 years, but should be removed to prevent interference with more suitable individuals or to provide space for new planting	Dangerous trees through structural defects including cavities, decay, included bark, wounds or poor form	Trees that have been regularly pruned to arteficially control growth
D		Trees that could be made suitable for retention in the medium term by remedial Care	Trees that require substantial remedial care and are only suitable for retention in the short term	Damaged trees that are clearly not safe to retain	
E				Trees that may live for more than 5 years, but should be removed to prevent interference with more suitable individuals or to provide space for new planting	
F				Trees that may cause damage to existing structures within 5 years	
G				Trees that will become dangerous after removal of other trees for reasons given in 1A-1F	

Ref: Barrell, Jeremy (1996)
Pre-development Tree Assessment
Proceedings of the International Conference on Trees and Building Sites (Chicago)
International Society of arboriculture, Illinois, USA

APPENDIX D: IACA RATING SYSTEM FOR TREE SIGNIFICANCE

Rating System for Tree Significance

The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. However, rating tree significance becomes subjective and difficult to ascertain in a consistent and repetitive fashion due to assessor bias. It is therefore necessary to have a rating system utilising structured qualitative criteria to assist in determining the retention value for a tree. This rating system will assist in the planning processes for proposed works, above and below ground where trees are to be retained on or adjacent a development site.

Once the landscape significance of an individual tree has been defined, the retention value can then be determined.

The terms used in the Assessment Criteria and Tree Retention Value - Priority Matrix, are taken from the IACA Dictionary for Managing Trees in Urban Environments 2009.

Tree Significance - Assessment Criteria

1. High Significance in landscape

- The tree is in good condition and good vigour;
- The tree has a form typical for the species;
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of significant age;
- The tree is listed as a Heritage Item, Threatened Species or part an Endangered ecological community or listed on Councils significant Tree Register;
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity;
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values;
- The growing environment supports the tree to its full dimensions above and below ground without conflict or constraint.

2. Medium Significance in landscape

- The tree is in fair-good condition and good or low vigour;
- The tree has form typical or atypical of the species;
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street,
- The tree provides a fair contribution to the visual character and amenity of the area,
- The tree is moderately constrained by above or below ground influences of the built environment to reach full dimensions.

3. Low Significance in landscape

- The tree is in fair-poor condition and good or low vigour;
- The tree has form atypical of the species;
- The tree is not visible or is partly visible from surrounding properties as obstructed by other vegetation or buildings,
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the area,
- The tree is a young specimen which may or may not have reached dimension to be protected by local Tree Preservation orders or similar protection mechanisms and can easily be replaced with a suitable specimen,
- The tree is severely constrained by above or below ground influences of the built or natural environment and therefore will not reach full dimensions - tree is inappropriate to the site conditions,
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms,
- The tree has a wound or defect that has potential to become structurally unsound.

Environmental Pest / Noxious Weed Species

- The tree is an Environmental Pest Species due to its invasiveness or poisonous/ allergenic properties,
- The tree is a declared noxious weed by legislation.

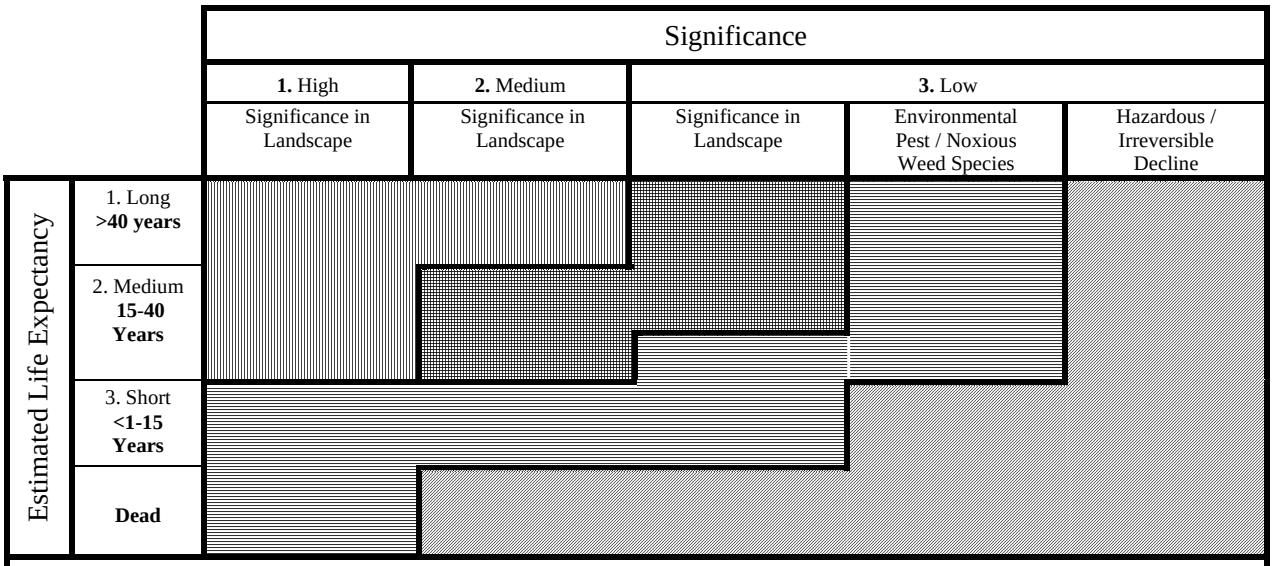
Hazardous/Irreversible Decline

- The tree is structurally unsound and/or unstable and is considered potentially dangerous,
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or part in the immediate to short term.

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

Note: The assessment criteria are for individual trees only, however it can be applied to a monocultural stand in its entirety e.g. hedge.

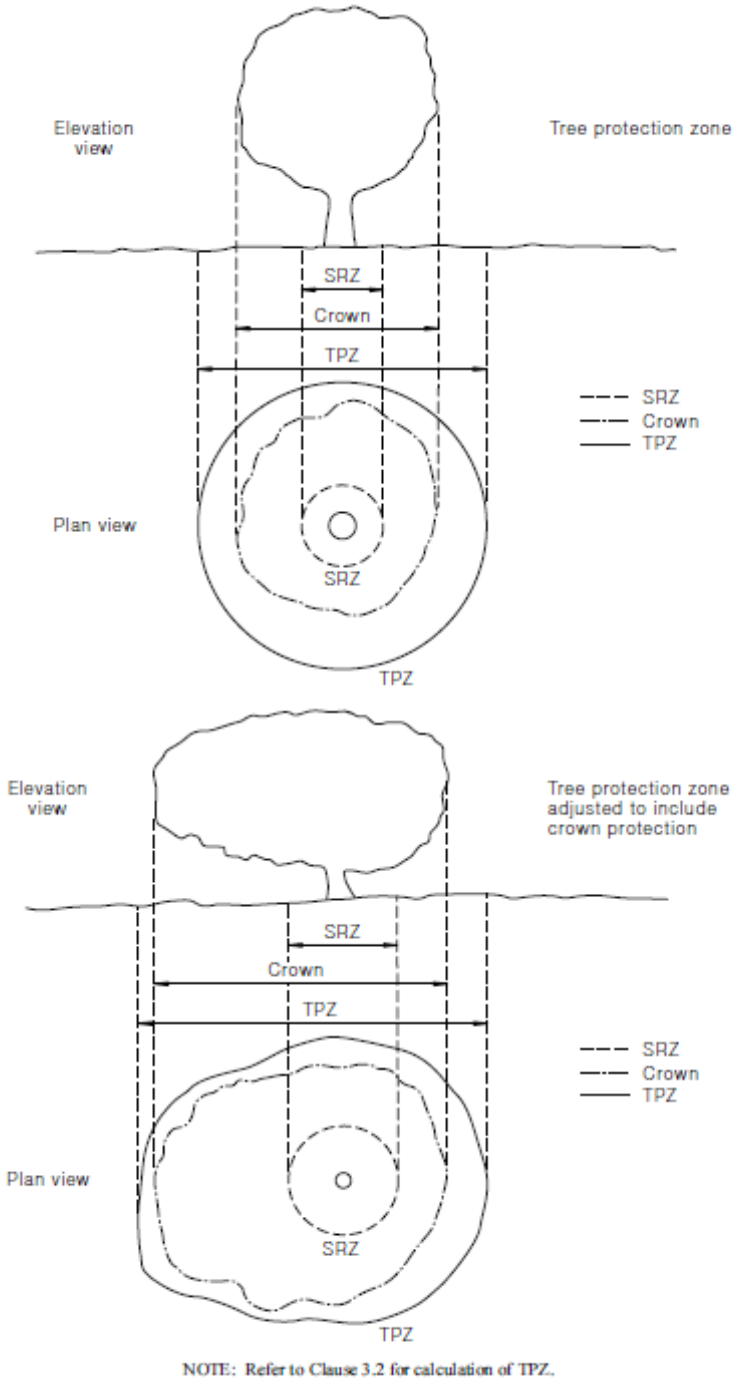
Table 1.0 Tree Retention Value - Priority Matrix.



Legend for Matrix Assessment

	Priority for Retention (High) - These trees are considered important for retention and should be retained and protected. Design modification or re-location of building/s should be considered to accommodate the setbacks as prescribed by the Australian Standard AS4970 *Protection of trees on development sites*. Tree sensitive construction measures must be implemented e.g. pier and beam etc if works are to proceed within the Tree Protection Zone.
	Consider for Retention (Medium) - These trees may be retained and protected. These are considered less critical; however their retention should remain priority with removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.
	Consider for Removal (Low) – These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.
	Priority for Removal – These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.

APPENDIX E: TREE PROTECTION ZONE ILLUSTRATION AS PER AS4970-2009



NOTE: Refer to Clause 3.2 for calculation of TPZ.

FIGURE 2 INDICATIVE TREE PROTECTION ZONE

Source: Australian Standards (2009)